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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/678,843

10/03/2003

Russell E. Abbink

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06/15/2006

INLIGHT SOLUTIONS, INC.
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EXAMINER

CONNOLLY, PATRICK J

ART UNIT

PAPER NUMBER

2877

DATE MAILED: 06/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/678,843	Applicant(s) ABBINK ET AL.	
	Examiner Patrick J. Connolly	Art Unit 2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 27-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>02.10.04</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Oath/Declaration

The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by serial number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because it fails to include mention of Application No. 10/116,271 to which the Applicant intends to claim priority under 35 U.S.C. § 120, as indicated by the "Related Applications" section of the Specification. Appropriate correction is required.

Priority under 35 U.S.C. § 120 to Application No. 10/116,267 is acknowledged.

Election/Restrictions

Applicant's election with traverse of the restriction requirement in the reply filed on April 06, 2006 is acknowledged. The traversal is on the ground(s) that groups I and II are related as combination/subcombination and not as subcombinations useable together. The Examiner concedes that the grounds for restriction should have been made on the basis of combination/subcombination, but as the grouping as set forth in the aforementioned action are still appropriate, the restriction is still proper on the basis of the grounds as set forth by the Applicant's remarks on traversal, received May 15, 2006. The following would be the proper basis for restriction based on the distinction of combination/subcombination.

Inventions II and I are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant

case, the combination as claimed does not require the particulars of the subcombination as claimed because any VCSEL etalon combination could be used in the spectrometer subassembly as a metrology source, not just one that emits a plurality of wavelengths in combination with an etalon providing light in a plurality of etalon passbands. The subcombination has separate utility such as an application requiring a stable multi-wavelength light source, for example a distance measuring interferometer in a lithographic stage assembly

The requirement is still deemed proper and is therefore made FINAL.

Claims 27-32 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on May 15, 2006.

Information Disclosure Statement

The Information Disclosure Statement filed February 10, 2004 has been considered and an initialed and signed copy should be found attached. The Examiner notes that none of the non-patent literature or foreign patent references was included in the filing of this continuation. An attempt was made to retrieve the originally filed IDS references, but the references are not still associated with the original file. Therefore, references have been considered in as much as they were considered in the Examiner's examination of the original parent application 10/116,267. The Applicant is invited to resubmit said references so that they may be scanned and further considered, if desired.

Claim Rejections - 35 USC § 102

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The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

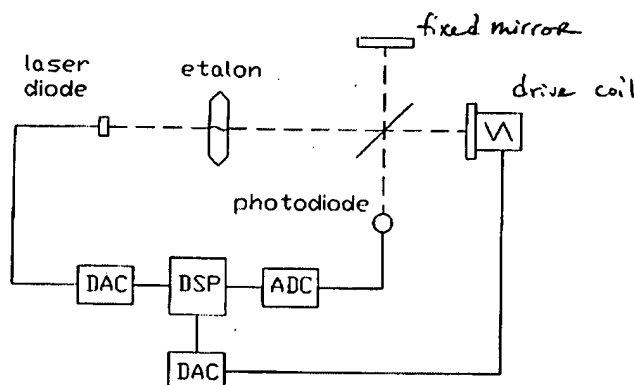
(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1-3, 10, 11 and 23 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by U.S. Patent Application Publication 2002/0097402 to Manning (hereafter Manning).

As to claim 1, Manning discloses an interferometer with etalon and VCSEL light source including (see Figure 9 below, see also paragraphs 0057-0063):

Figure 9



an interferometer including optical components for receiving light and passing light along a defined path (beamsplitter, fixed mirror, see above), the optical components including a beamsplitter and means for introducing a path length difference between the portions (drive coil w. reflector)

a vertical cavity surface emitting laser (laser diode, **see claim 5**), including electronic to drive the laser to project a beam therefrom (DAC, DSP above), operatively mounted with the interferometer with a portion of the laser beam generally following the defined light path and a portion of the beam interacting with a defined response element (etalon) and then to a detector (**this configuration is not pictured above, but paragraph 0058 provides that the etalon “may be placed anywhere in proximity to the interferometer, in the path from the laser to the detector”**), the VCSEL including an operating parameter control system for controlling an operating parameter of the VCSEL responsive to a signal from the detector (ADC, DAC, DSP, see also paragraph 0059).

As to claim 2, Manning discloses an etalon.

As to claim 3, Manning discloses current correction (see paragraph 0059).

As to claim 10, Manning discloses using the VCSEL light source as a reference laser (see paragraph 0058).

As to claim 11, Manning discloses (see analysis and Figure 9 above):

- a) a vertical cavity surface emitting laser subsystem (see claim 5, laser diode above);
- b) an interferometer, in optical communication with the vertical cavity surface emitting laser subsystem (fixed mirror, drive coil, beamsplitter above);
- c) an etalon subsystem, mounted in an optical path from the vertical cavity surface emitting laser subsystem to the interferometer (etalon above);
- d) a detector, in optical communication with the interferometer (detector above);
- e) a wavelength control processor, responsive to a signal from the detector and adapted to control an operating parameter of the vertical cavity surface emitting laser subsystem (DSP, ADC, DAC, see also paragraph 0059).

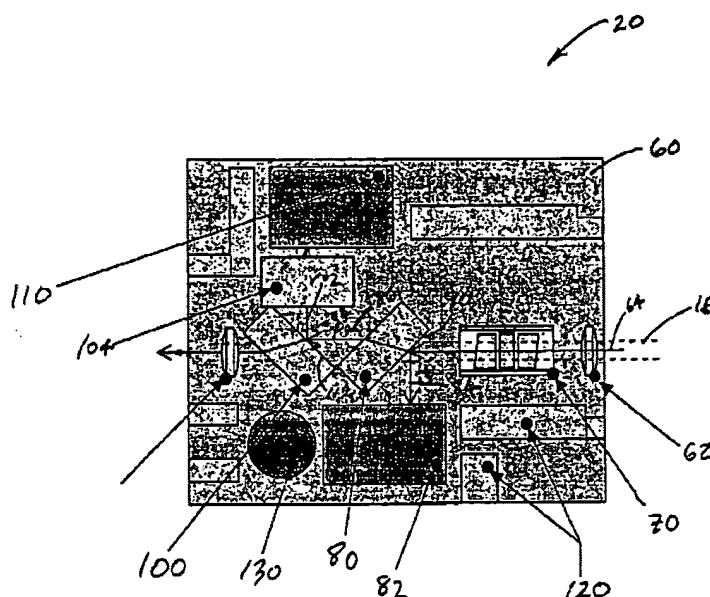
As to claim 23, Manning discloses a quartz plate for use as an etalon, which has two substantially parallel opposing surfaces where each surface is partially reflecting (see paragraph 0058).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4-9, 12-22 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manning as applied above in further view of U.S. Patent Application Publication 2003/0072336 to Senapati et al (hereafter Senapati).



As to **claims 13 and 15**, Manning is silent with respect to the collimation of the light source.

Senapati teaches collimating a VCSEL light source (see Figure 3, element 62, also paragraph 0028), but is silent with regard to motivation.

The Examiner takes Official Notice of the fact that it is well known in the art to collimate metrology sources, including VCSEL light sources because collimation conditions the laser output so as to provide a uniform coherent beam that does not significantly lose power over distance due to spreading or scattering.

It would have been obvious to one of ordinary skill in the art at the time of invention to use the collimating lens of Senapati in combination with the apparatus of Manning so as to achieve the aforementioned advantage.

With further regard to **claim 13**, see the analysis with respect to claims 1 and 11 above.

With further regard to **claim 15 and now regarding claim 17**, Manning teaches that additional detectors can be used in combination with the light source in order to monitor intensity (see paragraph 0061). It is understood that this would necessitate the use of auxiliary beamsplitters. Further, Senapati teaches an auxiliary beamsplitter (80) for monitoring intensity (see also paragraph 0028).

With further regard to claim 17, while Manning is silent to the specific arrangement of the additional detectors and beamsplitters, Senapati teaches the transmission axis of the etalon being oriented non-parallel (nearly orthogonal) to the transmission axis of the light source (see Figure 3 above).

The module of Senapati as taught in Figure 3 would be an input to the apparatus of Manning, as shown in Figure 6 above. As such, the limitations of the interferometer not being in communication with the beamsplitter in communication with the etalon would be met.

Finally, regarding **claims 15 and 17**, it would have been obvious to one of ordinary skill in the art at the time of invention to include the arrangement of Senapati in combination with the interferometer apparatus of Manning in order to facilitate the measurement of beam intensity.

As to claim 18, Manning is silent with respect to the arrangement of preventing returning light from entering the lasing cavity.

Senapati teaches the use of an isolator core for “eliminating feedback noise” into the laser. The Examiner takes Official Notice of the fact that the isolator core, in this arrangement, is a functional equivalent of using an aperture as they achieve the same end.

It would have been obvious to one of ordinary skill in the art at the time of invention to use an aperture instead of an isolator core in combination with the apparatus of Manning and Senapati, as it performs the same function of eliminating feedback light noise as the isolator core of Senapati.

As to claims 4, 12, 14, 16 and 26, Manning is silent with regard to thermal effects on the diode and VCSEL light sources, but teaches current control of the light source (see paragraph 0059).

Senapati teaches a miniaturized laser system including a VCSEL and an etalon (see bottom of paragraph 0025, also paragraph 0035). Senapati further teaches that the stability of this source depends on a number of factors including temperature (see paragraph 0006).

Senapati teaches incorporating a thermistor and temperature control circuit into both the laser package and the etalon in order to maintain the stability of the light source and the stability of the etalon for monitoring the light source.

It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate the temperature monitoring and control elements of Senapati into the light source and etalon of Manning in order to increase the stability of the light source thereby increase the accuracy of the source as a metrology source in a spectrometer or spectroscopy application.

As to claim 5, Manning is silent with respect to aligning the angle of the light source through feedback.

Senapati teaches active alignment of the beam through feedback controls (see paragraph 0027). This would be desirable in metrology for accurate laser positioning and subsequent accuracy in distance measurements.

It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate the active alignment controls of Senapati into the apparatus of Manning so as to achieve the above advantage in accuracy.

As to claim 6, Manning teaches that the intensity of the beam may be monitored with a second photodetector. Manning is silent with respect to incorporating feedback to the laser based on this measurement.

Senapati teaches adjusting the “output power of the output beam” in response to power fluctuations of the laser source (see paragraph 0011) for the purposes of stabilization.

It would have been obvious to one of ordinary skill in the art at the time of invention to adjust the power/energy/intensity of the detected output of the light source of Manning in order to maintain and increase stability of the light source.

As to claims 7, 8, 9, 19, 21, 24, both Manning and Senapati teach the adjustment of the intensity and wavelength of the light source in response to detection, and adjusting the light source to maintain a desired wavelength.

Neither Manning nor Senapati specifically teach advantages or method of optimizing the amount of energy in the light source’s output beam, be it maximized or minimized (Senapati teaches that the optimization of optical power is desirable. See for example, paragraph 0027).

The Examiner takes Official Notice of the fact that it is well known in the art to optimize the performance of optical elements, for example by choosing appropriate reflectance,

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absorbance and transmittal properties, and further that it is well known to optimize the amount of energy in a metrology beam as appropriate to said selected components so as to achieve the optimal signal possible, thereby increasing accuracy of the interference measurement. This optimization includes the maximization or minimization of beam energy for detection.

It would have been obvious to one of ordinary skill in the art at the time of invention to choose an etalon with appropriate reflection, absorbance or transmission properties in combination with monitoring and maintaining the light source of Manning and Senapati in order to achieve the above advantage and provide an accurate metrology source for the spectrometer of Manning.

As to claims 20 and 22, Manning teaches modulation of the light source current and demodulation of the detector signal by means of the DSP core and the ADC and DAC chips (see paragraph 0063).

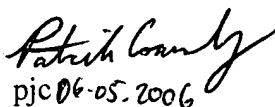
As to claim 25, Manning teaches a quartz plate etalon. See the analysis with respect to **claim 23** above.

"Several facts have been relied upon from the personal knowledge of the examiner about which the examiner took Official Notice. Applicant must seasonably challenge well known statements and statements based on personal knowledge when they are made by the Board of Patent Appeals and Interferences. In re Selmi, 156 F.2d 96, 70 USPQ 197 (CCPA 1946); In re Fischer, 125 F.2d 725, 52 USPQ 473 (CCPA 1942). See also In re Boon, 439 F.2d 724, 169 USPQ 231 (CCPA 1971) (a challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice). If applicant does not seasonably traverse the well-known statement during examination, then the object of the well-known statement is taken to be admitted prior art. In re Chevenard, 139 F.2d 71, 60 USPQ 239 (CCPA 1943). A seasonable challenge constitutes a demand for evidence made as soon as practicable during prosecution. Thus, applicant is charged with rebutting the well-known statement in the next reply after the Office action in which the well known statement was made."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick J. Connolly whose telephone number is 571.272.2412. The examiner can normally be reached on 9:00 am - 7:00 pm Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on 571.272.2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


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